Animal-Free™ Recombinant Human/Mouse/Rat follistatin-resistant Activin A

Catalog Number: Qk035

DESCRIPTION

Source	*E. coli*-derived Activin A protein
Predicted Molecular Mass	26 kDa (dimer)

SPECIFICATIONS

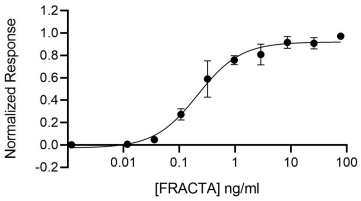
SDS-PAGE	Dimeric follistatin-resistant Activin A protein only
Activity	No significant difference between EC_{50} of reference and test lots
Endotoxin Level	<0.10 EU per 1 µg of the protein by the LAL method.
Mass Spectrometry	Single species with expected mass
Formulation	Lyophilized from acetonitrile/TFA See Certificate of Analysis for details.

PREPARATION AND STORAGE

Reconstitution	Resuspend in 10mM HCl at >100 µg/ml, prepare single use aliquots, add carrier protein if desired.
Shipping	The product is shipped lyophilized at ambient temperture, on ice blocks or dry ice. Shipping at ambient temperture does not affect the bioactivity or stability of the protein. Upon reciept, store immediately at the conditions stated below.
Stability & Storage	BulkLotPrefix assignment required for Storage Info

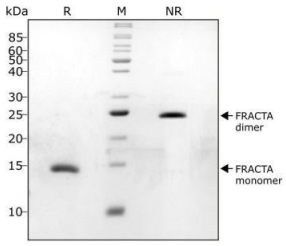
DATA

Bioactivity



Recombinant Human follistatin-resistant Activin A,AF Protein Bioactivity Activin A protein activity is determined using an activin-responsive firefly luciferase reporter in HEK293T cells. EC_{50} for wild-type activin A (Qk001) = 0.228 ng/ml (8.776 pM), EC50 for follistatin-resistant activin A (FRACTA, Qk035) = 0.212 ng/ml (8.2 pM).

SDS-PAGE



Recombinant Human follistatin-resistant Activin A,AF Protein SDS-PAGE FRACTA migrates as a single band at 24 kDa in non-reducing (NR) and 13 kDa as a single monomeric species upon reduction (R). No contaminating protein bands are visible. Purified recombinant protein (1 µg) was resolved using 15% w/v SDS-PAGE in reduced (+β-mercaptothanol, R) and non-reduced conditions (NR) and stained with Coomassie Brilliant Blue R250.

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BACKGROUND

Activin and Inhibin are members of the TGF-β superfamily of cytokines and are involved in a wide range of biological processes including tissue morphogenesis and repair, fibrosis, inflammation, neural development, hematopoiesis, reproductive system function, and carcinogenesis (1-7). Activin and Inhibin are produced as precursor proteins. Their amino terminal propeptides are proteolytically cleaved and facilitate formation of disulfide-linked dimers of the bioactive proteins (8, 9). Activins are nonglycosylated homodimers or heterodimers of various β subunits (βA, βB, βC, and βE in mammals), while Inhibins are heterodimers of a unique α subunit and one of the β subunits. Activin A is a widely expressed homodimer of two βA chains. The βA subunit can also heterodimerize with a βB or βC subunit to form Activin AB and Activin AC, respectively (10). The 14 kDa mature human βA chain shares 100% amino acid sequence identity with bovine, feline, mouse, porcine, and rat βA.

Activin A exerts its biological activities by binding to the type 2 serine/threonine kinase Activin RIIA which then noncovalently associates with the type 1 serine/threonine kinase Activin RIB/ALK-4 (7, 11). Signaling through this receptor complex leads to Smad activation and regulation of activin-responsive gene transcription (7, 11). The bioactivity of Activin A is regulated by a variety of mechanisms (11). BAMBI, Betaglycan, and Cripto are cell-associated molecules that function as decoy receptors or limit the ability of Activin A to induce receptor complex assembly (12-14). The intracellular formation of Activin A can be prevented by the incorporation of the βA subunit into Activin AC or Inhibin A (3, 10). And the bioavailability of Activin A is restricted by its incorporation into inactive complexes with α2-Macroglobulin, Follistatin, and FLRG (15, 16).

Activin A is involved in the differentiation of various cell and tissue types. The induction of definitive endoderm by Activin A is required in differentiation protocols of induced pluripotent stem cells (iPSCs) (17, 18). In vitro models of human gametogenesis use prolonged Activin A supplementation to human embryonic stem cells for differentiation into human primordial germ cell-like cells (19). Activin A can also be used to maintain cells in vitro, as is the case for iPSC-derived nephron cells that can then be used in disease modeling, drug screening and in regenerative medicine (20).

Activin A is an important factor for tumor cells to evade the immune system as Activin A can act on surrounding immune cells to decrease their antitumor activity (21). Activin A also promotes migration and growth of tumors, making it a target for cancer therapies (22). Specifically, research has shown that interfering with Activin A activity can assist in overcoming CD8 T-cell exclusion and immunotherapy resistance (23). In bone marrow-derived stem cell transplants for treatment of diabetes, Activin A enhances migration and homing of stem cells towards pancreatic lineage (24).

References:

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PRODUCT SPECIFIC NOTICES

The above product was manufactured, tested and released by R&D System's contract manufacturer, Qkine Ltd, at 1 Murdoch House, Cambridge, UK, CB5 8HW. The product is for research use only and not for the diagnostic or theraputic use.

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